

CLAIMS

1. A multi-speed transmission comprising:
 - an input shaft;
 - an output shaft;
 - first, second and third planetary gear sets each having
 - 5 first, second and third members;
 - a first and second input clutch connected with said
 - input shaft;
 - a first and second torque-transmitting mechanism
 - selectively interconnecting a first member and a second member of said first
 - 10 planetary gear set, respectively, with said first input clutch;
 - a third, fourth and fifth torque-transmitting mechanism
 - selectively interconnecting said first, second and third members of said first
 - planetary gear set with said first member of said second planetary gear set
 - and said output shaft;
 - 15 said second member of said second planetary gear set
 - being continuously connected with said second input clutch;
 - a sixth and seventh torque-transmitting mechanism
 - selectively interconnecting members of said second planetary gear set with
 - members of said third planetary gear set;
 - 20 an eighth and ninth torque-transmitting mechanism
 - selectively interconnecting members of said first planetary gear set with a
 - stationary member;
 - a tenth and eleventh torque-transmitting mechanism
 - selectively interconnecting members of said third planetary gear set with said
 - 25 stationary member;
 - a first interconnecting member continuously
 - interconnecting a member of said second planetary gear set with a member
 - of said third planetary gear set; and

said input clutches and torque-transmitting mechanisms
30 being engaged in combinations of at least three to provide at least six
forward speed ratios and a reverse speed ratio.

2. The transmission defined in claim 1, wherein said
eleven torque-transmitting mechanisms comprise synchronizers.

3. The transmission defined in claim 1, wherein said first
input clutch is applied for odd number speed ranges and said second input
clutch is applied for even number speed ranges.

4. The transmission defined in claim 1, wherein said first
input clutch is applied for even number speed ranges and said second input
clutch is applied for odd number speed ranges.

5. The transmission defined in claim 1, wherein said first
input clutch and said second input clutch are interchangeable to shift from
odd number speed ranges to even number speed ranges, and vice versa.

6. The transmission defined in claim 1, wherein selected
ones of said eleven torque-transmitting mechanisms are engaged prior to gear
shifting to achieve shifting without torque interruptions.

7. The transmission defined in claim 1, wherein at least
two of said synchronizers comprise a double synchronizer to reduce cost and
package size.

8. A multi-speed transmission comprising:
an input shaft;

an output shaft;
a stationary member;
5 first, second and third planetary gear sets each having first, second and third members;
a first and second input clutch connected with said input shaft;
said second member of said second planetary gear set
10 being continuously connected with said second input clutch;
a first interconnecting member continuously interconnecting a member of said second planetary gear set with a member of said third planetary gear set; and
eleven torque-transmitting mechanisms for selectively
15 interconnecting said members of said first, second or third planetary gear sets with said first or second input clutch, said output shaft, said interconnecting member, said stationary member or with other members of said planetary gear sets, said eleven torque-transmitting mechanisms being engaged in combinations of at least three to establish at least six forward
20 speed ratios and a reverse speed ratio between said input shaft and said output shaft

9. The transmission defined in claim 8, wherein a first and second of said eleven torque-transmitting mechanisms are selectively operable for interconnecting a first member and a second member of said first planetary gear set, respectively, with said first input clutch.

10. The transmission defined in claim 8, wherein a third, fourth and fifth of said eleven torque-transmitting mechanisms are selectively operable for interconnecting said first, second and third members of said first

planetary gear set with said first member of said second planetary gear set
5 and said output shaft.

11. The transmission defined in claim 8, wherein a sixth and seventh of said eleven torque-transmitting mechanisms are selectively operable for interconnecting members of said second planetary gear set with members of said third planetary gear set.

12. The transmission defined in claim 8, wherein an eighth and ninth of said eleven torque-transmitting mechanisms are selectively operable for interconnecting members of said first planetary gear set with said stationary member.

13. The transmission defined in claim 8, wherein a tenth and eleventh of said eleven torque-transmitting mechanisms are selectively operable for interconnecting members of said third planetary gear set with said stationary member.

14. The transmission defined in claim 8, wherein said first, second and third members of said planetary gear sets comprise a sun gear member, a ring gear member and a planet carrier assembly member, and wherein planet carrier assembly members of a plurality of said planetary
5 gear sets are of the single pinion type.

15. The transmission defined in claim 8, wherein said first, second and third members of said planetary gear sets comprise a sun gear member, a ring gear member and a planet carrier assembly member, and wherein planet carrier assembly members of a plurality of said planetary
5 gear sets are of the double pinion type.

16. The transmission defined in claim 8, wherein each of said eleven torque-transmitting mechanisms comprises a synchronizer.

17. The transmission defined in claim 8, wherein said first input clutch is applied for odd number speed ranges and said second input clutch is applied for even number speed ranges.

18. The transmission defined in claim 8, wherein said first input clutch is applied for even number speed ranges and said second input clutch is applied for odd number speed ranges.

19. 19. The transmission defined in claim 8, wherein selected ones of said eleven torque-transmitting mechanisms are engaged prior to gear shifting to achieve shifting without torque interruptions.

20. A multi-speed transmission comprising:
an input shaft;
an output shaft;
first, second and third planetary gear sets each having
5 first, second and third members;
a first input clutch connected with said input shaft;
a first and second torque-transmitting mechanism
selectively interconnecting a first member or a second member of said first
planetary gear set, respectively, with said input shaft and, therefore,
10 functioning as first and second input clutches;
a third, fourth and fifth torque-transmitting mechanism
selectively interconnecting said first, second and third members of said first
planetary gear set with said first member of said second planetary gear set
and said output shaft;

- 15 said second member of said second planetary gear set
being continuously connected with a third input clutch;
 a sixth and seventh torque-transmitting mechanism
selectively interconnecting members of said second planetary gear set with
members of said third planetary gear set;
- 20 an eighth and ninth torque-transmitting mechanism
selectively interconnecting members of said first planetary gear set with a
stationary member;
- a tenth and eleventh torque-transmitting mechanism
selectively interconnecting members of said third planetary gear set with said
25 stationary member;
- a first interconnecting member continuously
interconnecting a member of said second planetary gear set with a member
of said third planetary gear set; and
- said input clutches and torque-transmitting mechanisms
30 being engaged in combinations of at least three to provide at least six
forward speed ratios and a reverse speed ratio.

21. The transmission defined in claim 20, wherein nine of
said eleven torque-transmitting mechanisms comprise synchronizers.

22. The transmission defined in claim 20, wherein said
first or second input clutch is applied for odd number speed ranges and said
third input clutch is selectively applied for even number speed ranges.

23. The transmission defined in claim 20, wherein said
first or second input clutch is applied for even number speed ranges and said
third input clutch is selectively applied for odd number speed ranges.

24. The transmission defined in claim 20, wherein said first or second input clutch and said third input clutch are interchangeable to shift from odd number speed ranges to even number speed ranges, and vice versa.

25. The transmission defined in claim 20, wherein selected ones of said torque-transmitting mechanisms are engaged prior to gear shifting to achieve shifting without torque interruptions.

26. The transmission defined in claim 21, wherein at least two of said synchronizers comprise a double synchronizer to reduce cost and package size.

27. A multi-speed transmission comprising:
an input shaft;
an output shaft;
a stationary member;
5 first, second and third planetary gear sets each having first, second and third members;
a first and second input clutch connected with said input shaft;
said second member of said second planetary gear set
10 being continuously connected with said second input clutch;
a first interconnecting member continuously interconnecting a member of said second planetary gear set with a member of said third planetary gear set; and
nine torque-transmitting mechanisms for selectively
15 interconnecting said members of said first, second or third planetary gear sets with said first or second input clutch, said output shaft, said

interconnecting member, said stationary member or with other members of said planetary gear sets, said nine torque-transmitting mechanisms being engaged in combinations of at least three to establish at least five forward
20 speed ratios and a reverse speed ratio between said input shaft and said output shaft.

28. The transmission defined in claim 27, wherein a first and second of said nine torque-transmitting mechanisms are selectively operable for interconnecting a first member and a second member of said first planetary gear set, respectively, with said first input clutch.

29. The transmission defined in claim 27, wherein a third and fourth of said nine torque-transmitting mechanisms are selectively operable for interconnecting said first and second members of said first planetary gear sets with a first member of said second planetary gear set and
5 said output shaft.

30. The transmission defined in claim 27, wherein a fifth and sixth of said nine torque-transmitting mechanisms are selectively operable for interconnecting members of said second planetary gear set with members of said third planetary gear set.

31. The transmission defined in claim 27, wherein a seventh of said nine torque-transmitting mechanisms is selectively operable for interconnecting a member of said first planetary gear set with said stationary member;

32. The transmission defined in claim 27, wherein an eighth and ninth of said nine torque-transmitting mechanisms is selectively

operable for interconnecting members of said third planetary gear set with said stationary member.

33. The transmission as defined in claim 27, further comprising a tenth torque-transmitting mechanism.

34. The transmission defined in claim 33, wherein a first and second of said ten torque-transmitting mechanisms are selectively operable for interconnecting a first member and a second member of said first planetary gear set, respectively, with said first input clutch.

35. The transmission defined in claim 33, wherein a third, fourth and fifth of said ten torque-transmitting mechanisms are selectively operable for interconnecting said first, second and third members of said first planetary gear sets with a first member of said second planetary gear set and
5 said output shaft.

36. The transmission defined in claim 33, wherein a sixth and seventh of said ten torque-transmitting mechanisms are selectively operable for interconnecting members of said second planetary gear set with members of said third planetary gear set.

37. The transmission defined in claim 33, wherein an eighth and ninth of said ten torque-transmitting mechanisms are selectively operable for interconnecting members of said first planetary gear set with said stationary member.

38. The transmission defined in claim 33, wherein a tenth of said ten torque-transmitting mechanisms is selectively operable for

interconnecting a member of said third planetary gear set with said stationary member.

39. The transmission defined in claim 33, wherein said first, second and third members of said planetary gear sets comprise a sun gear member, a ring gear member and a planet carrier assembly member, and wherein planet carrier assembly members of a plurality of said planetary
5 gear sets are of the single pinion type.

40. The transmission defined in claim 33, wherein said first, second and third members of said planetary gear sets comprise a sun gear member, a ring gear member and a planet carrier assembly member, and wherein planet carrier assembly members of a plurality of said planetary
5 gear sets are of the double pinion type.

41. The transmission defined in claim 33, wherein each of said ten torque-transmitting mechanisms comprises a synchronizer.

42. The transmission defined in claim 33, wherein said first input clutch is applied for odd number speed ranges and said second input clutch is applied for even number speed ranges.

43. The transmission defined in claim 33, wherein said first input clutch is applied for even number speed ranges and said second input clutch is applied for odd number speed ranges.

44. The transmission defined in claim 33, wherein selected ones of said ten torque-transmitting mechanisms are engaged prior to gear shifting to achieve shifting without torque interruptions.